MINERALOGICAL ABSTRACTS

(Vol. 8, No. 4, December, 1941.)

New Minerals

Royo y Gómez (José). *Novedades mineralógicas.* Ciencia, Mexico, 1940, vol. 1, pp. 390–401.

A series of abstracts of recent papers describing new minerals grouped according to a chemical classification. L. J. S.

Woodford (A. O.), Laudermilk (J. D.), & Bailey (Edgar H.). *Treanorite, a new mineral from Crestmore, California.* Bull. Geol. Soc. Amer., 1940, vol. 51, p. 1965 (abstract).

Black, probably monoclinic crystals in the pegmatites of the Commercial quarry have composition and properties similar to, but not identical with, those of allanite. L. J. S.

Woodford (A. O.), Crippen (R. A.), & Garner (K. B.). *Section across Commercial quarry, Crestmore, California.* Bull. Geol. Soc. Amer., 1940, vol. 51, p. 1965 (abstract); Amer. Min., 1941, vol. 26, pp. 351–381, 7 figs.

The relations of the limestones, contact-rocks, and quartz-monzonite-porphyry and quartz-diorite pegmatites are discussed. About 120 minerals are listed with notes on their paragenesis and some optical data; these include 15 new and undetermined minerals, one of which is provisionally named treanorite (preceding abstract). [M.A. **1**–20, **5**–443, **6**–224, &c.] L. J. S.

Belyankin (D. S.) & Petrov (V. P.). [*Re-examining the chemical formula of hibschite.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1941, vol. 30, no. 5, pp. —.]

—— —— *The grossularoid group (hibschite, plazolite).* Amer. Min., 1941, vol. 26, pp. 450–453, 1 fig.

Analysis by I. M. Shumilo of hibschite from Nikortzminda, Georgia [M.A. **7**–462], still containing 8 % of unseparated garnet, gave SiO_2 27·57, TiO_2 0·67, Al_2O_3 18·52, Fe_2O_3 3·70, FeO 0·15, MnO 0·08, MgO 2·13, CaO 38·39, H_2O+ 8·55, H_2O- 0·29, CO_2 nil, total '100·00',

corresponding with $3CaO.Al_2O_3.2SiO_2.2H_2O$, i.e. the grossular formula with $2H_2O$ in place of SiO_2. Neglecting variable amounts of CO_2, analyses of plazolite give the same formula. These [identical] minerals are named grossularoid [cf. hydrogarnet, M.A. **8**–101]. The heating curve of hibschite from Nikortzminda shows an endothermal effect at 650–690° C. and exothermal effects at 870° and 940° C. Grossularoid is also recorded, as shells surrounding garnet, in limestone in contact with diabase in the Lopan gorge, Osetia, Transcaucasia; this has n_{Na} 1·686, and the garnet n_{Na} 1·822. L. J. S.

Sedletzky (I.) Седлецкий (И.). *Calcium montmorillonite in saline soils.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26, pp. 154–155.

Sodium saline soils from the bank of the Volga and from prov. Chernigov contain Ca 1·10–5·35, Mg 2·93–5·23 % and the material is identified by X-ray and thermal analysis as montmorillonite. The calcium is present as Ca-montmorillonite $(OH)_8(Al_2Ca_3)Si.CaSi_4O_{10}$, as distinct from Mg-montmorillonite $(OH)_8(Al_2Mg_3)Si.MgSi_4O_{10}$. W. Noll [M.A. **6**–353] prepared Ca-montmorillonite in strongly alkaline solutions. L. J. S.

Sedletzky (I. D.) Седлецкий (И. Д.). *On the principles of classification of argillaceous minerals.* Compt. Rend. (Doklady) Acad. Sci. URSS. 1940, vol. 26, pp. 240–243.

X-ray and thermal analysis of the weathering products in clays and soils show that these go through a series of progressive changes. The first mutable amorphous forms (mutabilites) pass into metastabilites and finally into stabilites. For example, silica gel ⇌ metaquartz ⇌ chalcedony; prokaolin ⇌ hydrokaolin ⇌ kaolinite; gel of montmorillonite ⇌ hydromontmorillonite ⇌ montmorillonite; &c. L. J. S.

[Sedletzky (I. D.) & Yusupova (S. M.) Седлецкий (И. Д.) и Юсупова (С. М.)] Sedletzky (I.) and Yussupova (S.). *Mineralogical composition of clays and their physical properties.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26, pp. 244–246.

Clays and loess from central Asia showing different degrees of base-exchange, swelling in water, and plasticity were separated into two fractions, $2-0{\cdot}2\mu$ and $<0{\cdot}2\mu$, and their chemical and mineralogical composition determined. The coarser fraction generally consists of

quartz and kaolinite, and the finer of montmorillonite and halloysite. The physical properties do not depend only on the amount of colloids present, but also on the mineralogical composition. White 'Ablick clay' contains in the finer fraction a new mineral, 'ablikite', with distinctive X-ray pattern and heating curve, to be described later. L. J. S.

[Sedletzky (I.) & Yussupova (S.). *Argillaceous minerals closely approaching halloysite.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26, no. 9, pp. 944–947, 2 figs.]; abstract in Amer. Min., 1940, vol. 25, p. 768.

X-ray, thermal, and chemical analyses of the $<0{\cdot}2\mu$ fraction of clay from Ablyk, Angren river, Uzbekistan, indicate a new mineral, ablykite, with the composition $R''O.2R_2O_3.5SiO_2.6H_2O$. Pseudopyrophyllite [F. Y. Levinson-Lessing, 1895; Min. Mag. **11**–333] was isolated from the pyrophyllite from Beresovsk, Ural. L. J. S.

History and Biography

Pledge (H. T.). *Science since 1500. A short history of mathematics, physics, chemistry, biology.* London (Science Museum), 1939, 357 pp., 15 pls., 11 text-figs. Price 7*s.* 6*d.*

In addition to the subjects mentioned in the title, there are brief references to geology and crystallography and passing mention of mineralogy. The treatment is rather diffuse with some repetition in the recurring statement that certain matters will be treated in more detail farther on in the text or that they have already been dealt with. The index includes a useful list of authors with their dates, and a series of outline maps show the places of their birth. L. J. S.

Bromehead (C. E. N.). *The evidence for ancient mining.* Geogr. Journ. London, 1940, vol. 96, pp. 101–120, 3 pls.

A general account of the relics of ancient mining from the flint mines of Neolithic man to those for metals (Au, Cu, Sn, Fe, Ag–Pb) and salt, with some references to the early literature. Special mention is made of the Ag–Pb mines at Laurion in Greece, Roman mines in Spain, and the tin trade in Britain. L. J. S.

Kraus (Edward H.). *Mineralogy.* Geology 1888–1938, Fiftieth Anniversary Volume, Geol. Soc. Amer., 1941, pp. 309–332.

A review of the progress of mineralogy during the past half century. L. J. S.

Carobbi (Guido). *Il contributo italiano al progresso della mineralogia, negli ultimi cento anni.* Un secolo di progresso scientifico italiano: 1839–1939 (Soc. Ital. Progr. Sci.), Roma, 1939, vol. 2, pp. 429–451.

Early authors were Vannoccio Biringuccio (1480–1538) and Domenico Guglielmini (1655–1710) [M.A. **7**–17]. The founders of modern mineralogy in Italy were Arcangelo Scacchi (1810–1893) and Quintino Sella (1827–1884). A review is given of the work of many later authors in crystallography, the physical and chemical properties of minerals, and the occurrence of minerals in different regions in Italy. L. J. S.

Thompson (R. Campbell) [1876–1941]. *On some Assyrian minerals.* Journ. Roy. Asiatic Soc., 1933, pp. 885–895.

—— *On the Assyrian words for "whetstone" and "corundum".* Ibid., 1934, pp. 343–346.

—— *An Assyrian chemist's vade-mecum.* Ibid. 1934, pp. 771–785.

Corundum, used for cutting gems, was known as algamišu. This is perhaps the origin of the Greek name adamas for diamond. [M.A. **6**–386.] L. J. S.

Esztó (P.). *Der Erzbergbau in Ungarn.—Mines métalliques en Hongrie. —Metal mining in Hungary.* Publ. Dept. Mining and Metallurgy, Univ. Sopron, 1938, vol. 10, pt. 3, pp. 347–358. (German with French and English summaries.)

A short history of metal mining in Hungary from prehistoric to recent times. V. Z.

Becksmann (Ernst). *N. Steno (1638–1686) und seine Stellung in der Geschichte der Geologie.* Zeits. Deutsch. Geol. Gesell., 1939, vol. 91, pp. 329–336, 2 figs. (Abstract, ibid., 1938, vol. 90, p. 536.)

Niels Stensen was born on January 1, 1638, the son of Sten Pedersen, a goldsmith of Copenhagen, and died at Schwerin on December 6, 1686. In his published work 'De solido intra solidum naturaliter contento' (Florence, 1669) he concluded that tilted strata containing fossils had been deposited horizontally in the sea. [Min. Mag. **18**–147; M.A. **4**–492, **5**–242.] L. J. S.

Berg (G.). *Die Heimat Abraham Gottlob Werner's.* Zeits. Deutsch. Geol. Gesell., 1938, vol. 90, pp. 634–644, 3 figs.

A memorial tablet is placed over the door of the house at Wehrau in

Prussian Silesia where A. G. Werner [1749–1817] was born. At the age of 14 he started as a clerk at the iron furnaces at Wehrau, where his father was manager. A sketch is given of the local geology. [M.A. **4**–483, **5**–243, **7**–17.] L. J. S.

Holmberg (Arne). *Berzelius-porträt. Portraits du chimiste suédois (1779–1843)*. Stockholm (Kung. Vetenskapsakad.), 1939, 52 pp., 33 pls., 35 text-figs.

A description of the many portraits of J. J. Berzelius. L. J. S.

Larsen (Esper S.). *Presentation of the second Roebling medal of the Mineralogical Society of America to Waldemar T. Schaller. Response* by Waldemar T. Schaller. Amer. Min., 1939, vol. 24, pp. 53–58, with portrait.

Winchell (A. N.). *Presentation of the third Roebling medal of the Mineralogical Society of America to Leonard James Spencer.* Ibid., 1941, vol. 26, pp. 161–162. *Acceptance* by Leonard James Spencer, pp. 163–166, with portrait.

The first award of this gold medal was to Charles Palache in 1937 [M.A. **7**–321]. L. J. S.

Bibliographies

Bibliografia polska—Bibliographie polonaise. Arch. Min. Tow. Nauk. Warszaw. (Arch. Min. Soc. Sci. Varsovie), 1937, vol. 13, pp. 114–116; 1938, vol. 14, pp. 106–107.

Continuations for the period 1935–38. [M.A. **7**–325.] L. J. S.

Sandegren (R.). *Revue annuelle de la littérature géologique suédoise 1938.* Geol. För. Förh. Stockholm, 1940, vol. 61 (for 1939), pp. 463–489.

—— —— *1939.* Ibid., 1941, vol. 62 (for 1940), pp. 309–331. [M.A. **7**–324.]

Mineralogisch-geologische Wissenschaften. Bibliographie der Schweizerischen naturwissenschaftlichen Literatur (Schweiz. Landesbibliothek), Bern, 1940, vol. 14 (for 1938), pp. 67–110.

Titles of papers published in 1938 by Swiss authors, in Swiss journals, and those relating to Switzerland in foreign journals. The sections on crystallography, mineralogy, and petrography have been compiled by

F. de Quervain. Other sections include rock weathering, economic geology and ore-deposits, &c. L. J. S.

Hall (A. L.) *A bibliography of South African geology for the years 1931 to 1935 (inclusive). Author's index.* Mem. Geol. Surv. South Africa, 1937, no. 30, 160 pp. Price 5*s*.

This further contribution [M.A. **5**–250] records titles numbered 10044–12276 arranged alphabetically under authors. E. D. M.

Bibliographie géologique de l'Afrique centrale. Édition provisoire. Association des Services Géologiques africains, Paris (Bureau d'études géol. et minières Coloniales) et Liége (Soc. Géol. Belgique), 1937, 298 pp. Price 80 fr.

Separate bibliographies are given for: General (14), French Equatorial Africa (504), Belgian Congo (1259), Angola (219), Kenya and Uganda (46), Tanganyika (261), Northern Rhodesia (301), Southern Rhodesia (643), and Nyasaland (75); the figures in brackets indicate the number of references in each section. Titles are grouped under years and in each year alphabetically according to authors. The period covered is from 1818 to 1934. A collective index of authors refers back to the numbered entries in the several sections. L. J. S.

Nickles (John M.), Siegrist (Marie), & Tatge (Eleanor). *Bibliography and index of geology exclusive of North America. Volume 6–1938.* Geol. Soc. Amer., 1939, xxi+471 pp.

—— —— *Volume 7–1939.* Ibid., 1940, xxi+522 pp. [M.A. **7**–323.]

Annotated bibliography of economic geology for 1938. Econ. Geol. Publishing Co., Urbana, Illinois, 1939, vol. 11, no. 2, pp. i–viii+209–391.

——*for 1939.* Ibid., 1940, vol. 12, viii+viii+340 pp. Price $5·00 a year.

——*for 1940.* Ibid., 1941, vol. 13, no. 1, pp. i–viii+1–165.

—— *General index, volumes I–X, 1928–1938.* Ibid., 1939, 496 pp. Price $5·00.

Continuation [M.A. **7**–323]. The detailed general index to the first ten volumes of this series gives authors, subjects, and localities in one alphabetical arrangement; it covers the literature for the period 1928–37 (not 1928–38). L. J. S.

Shedd (Solon). *Bibliography of the geology and mineral resources of California for the year 1937.* California Journ. Mines & Geol., 1939, vol. 35, pp. 275–307.

Titles of papers under authors, with a subject index. L. J. S.

Bulletin of the Geological Society of America. Index to volumes 41 to 50. New York (Geol. Soc. Amer.), 1941, 145 pp.

Alphabetical index of authors, subjects, and localities for the sessions 1929–1938 (years of publication 1930–1939). L. J. S.

Marble (John Putnam). *Annotated bibliography of articles relating to the measurement of geologic time.* Report of the Committee on the measurement of geologic time, 1938–1939, National Research Council, Washington, D.C., 1939, pp. 10–63 (mimeographed).

A continuation for the period April 1, 1938 to April 1, 1939, of the previous bibliography [M.A. 7–322.]. About 370 titles with short abstracts are listed under authors. L. J. S.

[Godlevsky (M. N.) & Nemilova (A. V.)] Годлевский (М. Н.) и Немилова (А. В.). Литература по кристаллографии, минералогии и геохимии за 1937 г. (СССР).—Godlevsky (M. N.) and Nemilova (A. V.). *Literature on cristallography, mineralogy and geochemistry for 1937 (USSR).* Зап. Всеросс. Мин. Общ. (Mém. Soc. Russe Min.), 1938, ser. 2, vol. 67, pp. 549–581.

This gives 464+9 titles (in Russian with English translations) of papers on crystallography, mineralogy, and geochemistry published during 1937, arranged alphabetically under authors. [M.A. 7–326.] S. I. T.

[Sobolev (V.) & Strutinskaya (A.)] Соболев (Вл.) и Струтинская (Ар.). Литература по петрографии и петрологии СССР за 1937 г.—Sobolev (Vl.) and Strutynskaya (Ar.). *Literature on petrography and petrology of the USSR for 1937.* Зап. Всеросс. Мин. Общ. (Mém. Soc. Russe Min.), 1938, ser. 2, vol. 67, pp. 661–686.

A list of 335 titles (in Russian with English translations) is given, arranged under subjects and localities. [M.A. 7–327.] S. I. T.

Геологическая литература СССР, библиографический ежегодник за 1937 г.—*Geology of USSR, bibliographical annuary for 1937.* Leningrad & Moscow (Central Geological Library), 1939, 227 pp.

Titles of 4000 papers and books, in Russian with English translations, are grouped under various subject headings, including: crystallography and mineralogy, geochemistry, petrology, meteoritics, useful minerals, prospecting, &c. The preface, table of contents, and headings in the catalogue are in both Russian and English. Author, subject, and regional indexes are appended. In the preface it is stated that the first volume, for 1934, of this catalogue of Russian geological literature appeared in 1937; those for 1935 and 1936 are in the press, and that for 1938 is in preparation. L. J. S.

Museums and Collections

North (F. J.), Davidson (C. F.), & Swinton (W. E.). *Geology in the museum.* London (Museums Association; Oxford Univ. Press), 1941, viii+97 pp., 6 pls. Price 5*s*.

Useful information and hints suitable for the smaller one-curator museums are given by members of the geological staff of the larger national museums. The three sections—Rocks and general exhibits, Minerals, and Fossils—are each by the three authors respectively. On page 1 there is a wonderful sentence of 143 words. The shorter section (19 pages) on minerals contains more than once the common error 'Moh's scale'. The statement that boracite is efflorescent does not apply to single crystals. L. J. S.

Harker (Alfred) [1859–1939]. *The Cambridge collection of rock-slices.* Geol. Mag. London, 1939, vol. 76, pp. 35–37.

A brief history and some account of the contents of the collection of some forty thousand slides in the Department of Mineralogy and Petrology at Cambridge. The collection was begun about sixty years ago. It includes the collections of T. G. Bonney and J. J. H. Teall as well as that made by the author himself, though he says little about the last. W. C. S.

Donnay (J. D. H.). *The new School of Mines in Quebec.* Univ. Toronto Studies, Geol. Ser., 1940, no. 44, pp. 21–29, 3 figs.

A large new building for geology, mineralogy, mining and metallurgy, constitutes an important addition to the Faculty of Science of Laval

University. The Department of Geology and Mineralogy is well equipped for teaching and research and provided with a museum with a growing collection, including H. Ungemach's [1879–1936] collection of about 3000 measured crystals with his note-books. Among many well-planned features are the individual desks in the instruction rooms, designed for note-taking and practical work with hand-specimens and microscopic preparations. M. A. P.

Moore (E. S.). *History of the Royal Ontario Museum of Geology.* Contributions to the Royal Ontario Museum of Geology [Toronto], 1939, no. 1, 17 pp., 1 pl., 1 text-fig.

The collections in the department of geology of the University of Toronto were transferred in 1913 to the new Royal Ontario Museum, and in 1932 they were displayed to much better advantage in two large galleries in the new building. The first director (1913–22) was A. P. Coleman (1852–1939), whose portrait is reproduced, and by whom the collections were largely built up. The collections include building and ornamental stones, ores and other economic minerals and their products, and models of geological structures and mining districts. Many of the specimens are huge blocks showing the associated country-rock. L. J. S.

Parsons (A. L.). *The Royal Ontario Museum of Mineralogy.* Univ. Toronto Studies, Geol. Ser., 1939, no. 42, pp. 7–22, 3 figs.

After the University of Toronto collection of minerals and rocks was destroyed by fire, the W. F. Ferrier collection was purchased in 1894, and this was transferred to the new Museum in 1912, and again to the new wing in 1932. Material salvaged from the fire at Victoria University and from the closing of the Ontario Provincial Museum has been incorporated. Under the directorship (1901–37) of T. L. Walker the collections have shown a rapid growth. An account is given of the very complete systematic collection of minerals and of the several special collections, and of their installation. [M.A. **5**–395; **7**–18, 322.]

L. J. S.

Buttgenbach (H.). *Le musée de minéralogie de l'université de Liége.* Liége (H. Vaillant-Carmanne), 1938, 41 pp.

The collection, which has recently been removed to new quarters, dates from 1818, when H. M. Gaède had charge of the course of

mineralogy, followed by A. Lévy in 1828. It has recently been augmented by the collection of H. Ungemach [1879–1936]. In addition to the general collection, there are collections of Belgian (114 species) and Congo (138 species) minerals, and special collections (crystallography, pseudomorphs, gemstones, &c.). A list is given of the mineral species represented. L. J. S.

Fiala (František). *Štátne banské muzeum Dionýza Štúra v Banskej Štiavnici. K 10ročnému jubileu založenia muzea.—Le musée minier d'état Dionýz Štúr à Banská Štiavnica (à l'occasion du dixième anniversaire de sa fondation).* Sborník štátneho banského muzea Dionýza Štúra v Banskej Štiavnici (Bull. Musée minier d'état Dionýz Štúr à Banská Štiavnica, Tchècoslovaquie), 1937, vol. 1 (for 1927–37), pp. 7–31 (Czech), 31–37 (French), 18 figs.

—— *Ľudovít Cseh, banský geolog banskoštiavnický (1840–1908).—Ľudovít Cseh, géologue-prospecteur de Banská Štiavnica (1840–1908).* Ibid. pp. 163–168 (Czech), 169–173 (French), 1 fig. (portrait).

An account is given of the mining museum at Banská Štiavnica [= Schemnitz] in Slovakia, which was started in 1927 with the collections of Ľudovít (Lajos) Cseh. L. J. S.

Gordon (Samuel G.). *Display and reference exhibits in museums.* Nature, London, 1938, vol. 141, pp. 213–214.

An account of the new display of educational exhibits and the storage of reference collections in the department of mineralogy in the Academy of Natural Sciences of Philadelphia. L. J. S.

Radioactivity

Keevil (Norman B.). *Interatomic forces and helium in rocks.* Proc. Amer. Acad. Arts & Sci. 1940, vol. 73, pp. 311–359, 20 figs.

A useful résumé on the physics of the helium atom is followed by a detailed discussion of the evidence for the retention of helium in ordinary rocks. It is concluded that ages obtained from the helium contents of carefully selected minerals should not differ from the true values by more than the present experimental errors of measurement. F. A. B.

Keevil (N. B.). *Helium retentivities of minerals.* Amer. Min., 1941, vol. 26, pp. 403–404.

Provisional approximate estimates of the proportions of helium re-

tained by different minerals are: felspars $\frac{1}{4}$, quartz $\frac{1}{3}$, $\frac{1}{2}$ mica, rocks $\frac{2}{5}$, pyroxenes $\frac{3}{4}$, hornblende and magnetite about 1. These values may, however, vary under variable conditions, giving different age values. [M.A. **7**–341.] L. J. S.

Herling (E. K.) Герлинг (Э. К.). *Part taken by close packing of crystals in the diffusion of helium.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 24, pp. 274–277.

The volumes per oxygen atom of various rock-forming minerals are tabulated and it is seen that, except for garnet, they all have an open structure; e.g. for felspars 21–23 Å.^{3}, as compared with 13·9 Å.^{3} for the volume of an oxygen atom. Helium can therefore diffuse through the inter-crystalline spaces; and in the helium method of age determination a low result is obtained. Minerals with closer packing and with an absence of cleavage give better results. L. J. S.

Meyer (Stefan). *Über das "Alter" der Sonne, über die Zerfallskonstante des Actinurans und über das Mengenverhältnisse Blei zu Thor zu Uran auf der Erde.* Sitzungsber. Akad. Wiss. Wien, Math.-Naturwiss. Kl., 1937, vol. 146, Abt. IIa, pp. 175–197, 4 figs.; Naturwiss., 1937, vol. 25, pp. 764–765, 1 fig.

From the half-life periods of the radioactive elements and the relative abundance of their break-down products, the probable age of the sun (defined as the period it has remained in approximately its present state) may be deduced; a value of $4{\cdot}6 \times 10^9$ years is found. M. H. H.

Kirsch (G.) & Hecht (F.). *Zur Geochemie von Uran und Thorium.* Zeits. Anorg. Chem., 1938, vol. 236, pp. 157–164, 3 figs.

The Th/U and Pb/(U + k.Th) ratios for uranium minerals from several localities, especially for bröggerite from Raade and Moss, Norway, show marked variations; these appear to bear a periodic relation to one another, and are also related to the $UO_2 : UO_3$ ratio. The cause of these variations is probably to be found in a long-continued formation of fresh crops of bröggerite crystals, extending over several erosion cycles; the crystals were not necessarily formed in situ. Various geological bearings of this theory are discussed. Thorianites are typical of magmas poor in oxygen and water, the thorium-poor uraninites of water- and oxygen-rich magmas; thorium apparently is not concentrated in the last stages of differentiation, as uranium is, and while the

sial is probably richer in thorium than the sima, the concentration is slight, and the average Th/U ratio for the lithosphere must be greater than is currently supposed and may reach 6 to 7. M. H. H.

Hahn (Otto) & Walling (Ernest). *Über die Möglichkeit geologischer Altersbestimmungen rubidiumhaltiger Mineralien und Gesteine.* Zeits. Anorg. Chem., 1938, vol. 236, pp. 78–82.

The determination of the geological age of a mineral from the Rb^{87}/Sr^{87} ratio is discussed. The method has several advantages over methods depending on the radioactivity of U and Th; thus the rubidium-bearing minerals are common ones (felspar, mica), and since there is no accumulation of He, and no α-ray activity, the minerals are less likely to have undergone appreciable alteration. M. H. H.

Brewer (A. Keith). *Isotopes of potassium.* Ind. Eng. Chem. (Amer. Chem. Soc.), 1938, vol. 30, pp. 893–896, 5 figs.

The ratio K^{39}/K^{41} does not vary appreciably in different minerals or sea-water, but a small separation is effected by some plant and animal tissues. The radioactive behaviour and abundance of K^{40} are discussed. It is shown that the present abundance ratios $(Ca^{40}+A^{40})/K^{40}$ and Sr^{87}/Rb^{87} agree in assigning a maximum probable age of 15×10^9 years to the elements. The abundance of the radioactive elements at this period would be adequate to maintain the temperature of a body the size of the earth at about 1000° C. M. H. H.

Urry (Wm. D.). *The radioactive determination of small amounts of uranium.* Amer. Journ. Sci., 1941, vol. 239, pp. 191–203.

Uranium is co-precipitated with Al_2O_3 and Fe_2O_3, and in the precipitate rate of emission of α-particles is determined. The results obtained for different rocks range from 1·74 parts per million in kimberlite to 12·9 in dunite (1·97 in another sample of dunite) and 0·65–1·07 in oceanic deposits. L. J. S.

Shaub (B. M.). *Age of the uraninite from the McLear pegmatite near Richville Station, St. Lawrence County, New York.* Amer. Min., 1940, vol. 25, pp. 480–487, 3 figs.

Cubes (5 mm.) of uraninite, sp. gr. 9·03, occur in white quartz of the pegmatite yielding on micro-analysis a lead-uranium-thorium ratio 0·156. The ratio is close to that for a number of uraninites from Ontario

and the age of the mineral is 1094 million years, about the middle of the pre-Cambrian period. F. A. B.

Spence (Hugh S.). *Uraninite and thucholite from Pied des Monts, Charlevoix County, Quebec.* Amer. Min., 1940, vol. 25, pp. 711–718, 3 figs.

Details are given of the occurrence in the old mica mine in pegmatite. The uraninite is much veined and crusted over with thucholite. Thucholite is also found as small nodules. [M.A. 7–499.] L. J. S.

Sarkar (Tripura Charan). *The lead ratio of a crystal of monazite from the Gaya district, Bihar.* Proc. Indian Acad. Sci., Sect. A, 1941, vol. 13, pp. 245–248.

An unaltered crystal with reddish-brown colour and bright resinous lustre gave SiO_2 1·56, P_2O_5 27·22, Al_2O_3 1·20, Fe_2O_3 0·44, rare-earths 55·87 (Ce_2O_3 22·00, Yt_2O_3 1·15), ThO_2 12·00, U_3O_8 0·2677, PbO 0·5331, MgO 0·09, CaO 0·83, C n.d., Mn trace, H_2O+ 0·48, H_2O- 0·15, total 100·64, sp. gr. 5·16. The ratio Pb/(U + 0·36 Th) = 0·123, gives a corrected age of 875 million years, corresponding to the upper limit of the middle pre-Cambrian (post-Dharwar), for the pegmatite matrix. L. J. S.

Goddard (Edwin N.) & Glass (Jewell J.). *Deposits of radioactive cerite near Jamestown, Colorado.* Amer. Min., 1940, vol. 25, pp. 381–404, 11 figs.

Cerite occurs as minute grey, pinkish-brown, or lavender-grey grains, 2V 0–8°, α 1·815, β 1·815, γ 1·820, associated with allanite, epidote, törnebohmite, fluorite, bastnäsite, monazite, uraninite, and quartz in irregular lenses in narrow aplite-pegmatite zones bordering areas of schist in Silver Plume granite. Analysis of the cerite lenses shows that about 75 % is cerite of normal composition. The lead-uranium ratio of the mineral, subject to a 20 % error, leads to an age determination of 940 million years, i.e. middle pre-Cambrian period. The Silver Plume granite is younger than the Pike's Peak granite. F. A. B.

Ribeiro (J. Costa). *Sôbre a radioatividade de alguns minerais brasileiros.* Ann. Acad. Brasileira Sci., 1940, vol. 12, pp. 117–123, 2 figs.

Compared with the radioactivity of black oxide of uranium as 1·00, the following values were obtained: monazite from Divino de Ubá 0·37, samarskite from Divino de Ubá 0·53, polycrase from Pomba 0·54,

uraninite from Serra da Moeda 0·54, uraninite from Engenho Central 3·85, and curite from Belgian Congo 3·62. L. J. S.

Hirschi (H.). *Radiohalos im Chlorit der Erzlagerstätte von Kaltenberg im Turtmanntal (Wallis).* Schweiz. Min. Petr. Mitt., 1939, vol. 19, pp. 222–223, 1 pl.

Measurements are given of pleochroic haloes in chlorite. L. J. S.

Rock-forming Minerals and Petrology

Korzhinsky (D. S.) Коржинский (Д. С.). *Liquid inclusions as the cause of imaginary pelitization of feldspars.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 29, pp. 112–114.

Turbid felspars in the majority of rocks examined under a high magnification show the presence of minute liquid inclusions of low refractive index, rather than colloidal clay particles. [Min. Mag. **22**–524.] L. J. S.

Sugi (Ken-ichi). *On the nature of some plagioclase apparently with small optical angle, with special reference to the plagioclase in olivine-dolerite from Fu-shun, Manchuria.* Mem. Fac. Sci. Kyūsyū Imp. Univ., Ser. D, Geology, Hukuoka, Japan, 1940, vol. 1, pp. 1–22, 21 figs.

Sections of labradorite-andesine phenocrysts approximately parallel to (010) sometimes show a band or patch with low birefringence and small optical axial angle, bordered on either side by areas with normal optical characters but of reversed orientation. This is due to an overlapping of two portions in twinned position, probably according to the Carlsbad or Carlsbad-albite law. The black brushes are called 'pseudo-melatropes'. Analysis of the olivine-dolerite from Fu-shun shows only 0·40 % K_2O; and it is possible that the abnormal optical characters of potash-andesine [Min. Mag. **24**–621] and of anemousite [M.A. **4**–398, 508] may also be due to this overlapping. A similar abnormal plagioclase is noted from several Japanese rocks. L. J. S.

Donnay (J. D. H.). *Width of albite-twinning lamellae.* Amer. Min., 1940, vol. 25, pp. 578–586, 1 fig.

A curve which has been plotted giving the obliquity of the albite twin in terms of plagioclase composition shows a minimum for oligoclase. Friedel's theory of twinning predicts that the width of albite-twinning lamellae is related to the frequency of the twin. The width

of the lamellae increases as the plagioclase composition varies from oligoclase to anorthite. In anorthite the lamellae are broad and twinning is less frequent. These predictions are found to be in agreement with recorded observations. F. A. B.

Fernando (L. J. D.). *Petrology of certain felspathised rocks from Herma Ness, Unst, Shetland Islands.* Proc. Geol. Assoc. London, 1941, vol. 52, pp. 110–130, 2 pls.

Ovoids of felspar up to an inch across occur in certain bands of the hornblende- and mica-schists, giving the structure of an 'augen-granite'. In some parts the felspar is a potash-felspar and in others plagioclase; and sometimes potash-felspar is surrounded by a rim of plagioclase, giving the rapakivi texture. It is suggested that the country-rocks were invaded by magmatic fluids—first potassic and then sodic. L. J. S.

Pagliani (Giovanna). *Su alcune rocce e minerali della miniera di talco delle Fontane (valle della Germanasca).* Atti Soc. Ital. Sci. Nat., Museo Civico, Milano, 1939, vol. 78, pp. 25–39.

Chemical analyses are given of amphibolites, gneiss, and prasinite. Albite from crevices in prasinite gave: SiO_2 66·70, Al_2O_3 21·24, CaO 1·26, Na_2O 10·06, K_2O 0·10, H_2O+ 0·24, H_2O- 0·02 = 99·62; sp. gr. 2·610, α 1·529, β 1·535, γ 1·539, extinction on (001) 0–2°, on (010) −14°. The optical data correspond to $Ab_{92}An_8$, and the analysis to $Ab_{92\cdot61}An_{7\cdot39}$. L. J. S.

Taneda (Sadakatu). *Petrographic notes on the volcanic rocks from Haruna, central Japan. Part I.* Mem. Fac. Sci. Kyūsyū Imp. Univ., Ser. D, Geology, Hukuoka, Japan, 1941, vol. 1, pp. 43–68, 10 figs.

Optical data are given for hypersthene and hornblende from pyroxene-andesite and hornblende-andesite. The hypersthene ranges from Fs 20 to Fs 40; plotting the refractive indices on Winchell's curves, there is then no agreement with the curve for the optic axial angle [M.A. **2**–219, **6**–210; Min. Mag. **24**-165, 221]. The hornblende is of three kinds: green, brown, and red-brown (oxyhornblende [M.A. **5**–216]); they show a gradation through the series owing to oxidation, with opacitization of 'black' and 'pyroxenic' types. L. J. S.

Turner (F. J.). *Note on determination of optic axial angle and extinction angle in pigeonites.* Amer. Min., 1940, vol. 25, pp. 821–825, 1 fig.

A method of determining unequivocally the optical orientation of

nearly uniaxial pigeonites using the Fedorov stage. Data are given for a twinned crystal of the mineral in diabase from West Rock, Connecticut, leading to a composition $Wo_6En_{50}Fs_{44}$ or $Wo_{10}En_{67}Fs_{23}$. F. A. B.

Kuno (Hisashi). *Pigeonite in the groundmass of some andesite from Hakone volcano.* Journ. Geol. Soc. Japan, 1940, vol. 47, pp. 347–351, 2 figs.

The pigeonite from this locality [M.A. **6**-295] varies in its optical characters. Some grains are biaxial with 2V 36–44° (mean 42°), α 1·700, β 1·705, γ 1·725, and others nearly uniaxial with $\alpha = \beta$ 1·713, γ 1·738, corresponding to $Wo_{28}En_{37}Fs_{35}$ and $Wo_9En_{35}Fs_{56}$. Analysis by I. Iwasaki of separated material gave SiO_2 50·28, TiO_2 0·59, Al_2O_3 2·03, Fe_2O_3 2·33, FeO 21·70, MnO 0·38, MgO 14·77, CaO 8·02, Na_2O n.d., K_2O n.d., H_2O negligible, total 100·10, corresponding to $Wo_{18}En_{39}Fs_{43}$ wt. %. [Min. Mag. **17**–97.] L. J. S.

Naidu (P. R. Jagapathy). *A note on blue amphiboles.* Journ. Mysore Univ., 1941, new ser., Sect. B—Science, vol. 1, pp. 159-170, 1 fig.

Blue amphiboles in charnockite and pyroxene-gneiss, in Mysore have $\beta - \alpha$ 0·015–0·028 (usually 0·015–0·018 or 0·023), 2V 45–90° (usually about 70°), negative, $\gamma : c$ = 10–21° (average 15°); pleochroism, α yellowish-green or yellow, β brownish-green or yellowish-green, γ bluish-green or greenish-blue. These data indicate mixtures of pargasite, common hornblende, and glaucophane molecules. L. J. S.

Yamada (Hisao). *Preliminary note on hastingsitic amphibole in aplitic granite from Taihu, Nagano prefecture, Japan.* Journ. Geol. Soc. Japan, 1940, vol. 47, pp. 224–227, 2 figs.

Hastingsite, previously found only in alkalic rocks with low silica, is now described from a vein of aplitic granite traversing porphyritic granite. The compact rock consists of quartz, orthoclase (α 1·518, β 1·523, γ 1·526, 2V 73°, extinction on (010) 5–5½°), plagioclase (n 1·5395–1·5430, $Ab_{70}An_{30}$–$Ab_{78}An_{22}$), biotite ($\gamma = \beta$ 1·655, 2V 0°), a small amount of dark bluish-green amphibole, and accessory apatite and allanite. The amphibole has α 1·679, β 1·697, γ 1·703, 2V 25°, negative, pleochroism, α pale green, β dusky green, γ dark blue. About 100 chemical analyses of amphiboles from igneous rocks are plotted on a triangular diagram $MgO - FeO - Na_2O + TiO_2$: those from alkalic rocks and from calc-alkalic rocks fall into separate fields.

L. J. S.

Jayaraman (N.). *Alteration of tremolite to talc in the dolomitic marbles of Yellandu Warangal district (Hyderabad, Dn.).* Proc. Indian Acad. Sci., Sect. A, 1940, vol. 12, pp. 65–71, 2 figs.

A series of six analyses shows the gradual change in the pseudomorphous alteration of tremolite (anal. I) to talc (anal. II), this change having been effected by the action of surface waters.

	SiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MgO.	CaO.	F.	H_2O.	Total.	Sp. gr.
I.	57·98	0·16	0·11	1·12	24·39	13·92	trace	1·85	99·53	2·9962
II.	61·07	2·42	1·49	nil	29·13	0·75	—	4·82	99·68	2·7165

L. J. S.

Kuno (Hisashi). *Occurrence of fayalite in some dacites from north Izu and adjacent areas.* Journ. Geol. Soc. Japan, 1940, vol. 47, pp. 228–232, 4 figs.

Black lustrous crystals ($\frac{1}{2}$ mm.) of fayalite occur in tridymite nests and drusy cavities in dacite from near Kaziya. They show the crystal-forms *a s b d e k* [Dana's letters] and have α 1·802, 2V 56°, negative, corresponding to Fo_8Fa_{92} (wt. %). Fayalite also sometimes forms a reaction rim around porphyritic hypersthene which is rich in iron (γ 1·724–1·730, rarely 1·706, 2V 55°, negative, corresponding to $En_{48}Fs_{52}$ $-En_{43}Fs_{57}$ wt. %). A similar occurrence of fayalite is also described from near Kamitaga. L. J. S.

Hall (A. Jean). *The relation between colour and chemical composition in the biotites.* Amer. Min., 1941, vol. 26, pp. 29–33, 1 fig.

—— *The relation between chemical composition and refractive index in the biotites.* Ibid., pp. 34–41, 1 fig.

Fifty-six recent analyses of biotites show that iron is responsible for producing the green colours, while titania gives the brown and red colours of biotites. Magnesia dilutes or masks the effect of titania, however, and it is concluded that colour can yield very little real indication of the composition of a biotite. Neither can sure information be obtained as to the chemical composition from refractive index alone. Plotting the values of γ with the total iron content reveals the influence of Fe″, Fe‴, Ti⁗, and also Ti‴, Mn″, Zr⁗, Cr‴, &c., upon the refractive index. F. A. B.

[Zemyatchensky (P. A.)] Zemiatchensky (P.) Земятченский (П). *Contribution of the problem of dependence of weathering of minerals upon climatic conditions.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 25, pp. 496–499.

Sheets of colourless, flexible and elastic muscovite (anal. I) from

Tchupa, Karelia, show towards the edges a gradual transition to discoloured, turbid, brittle, and crumbly material (anal. II). Analyses are also given of the portion soluble in soda solution and HCl, and of similar material from the windows of a ruined church at Viatka. The cold humid climate leads to leaching of Al_2O_3 and alkalis and the accumulation of SiO_2, MgO, and H_2O.

	SiO_2.	Al_2O_3.	Fe_2O_3.	MgO.	CaO.	$K_2O(Na_2O)$.	H_2O+.	Total.	H_2O-.
I.	43·50	34·67	4·91	0·64	0·16	9·83	6·14	99·85	2·22
II.	44·48	33·81	4·83	0·93	0·50	8·75	6·36	99·66	2·10

L. J. S.

Stoicovici (E.) & Gliszczynski (S. von). *Die Entstehung des Chlorits aus einer kolloidalen späthydrothermalen Phase. I. Teil. Die grünen jaspisähnlichen Massen aus den Andesiten von Săbișea, Valea Bradului, und von Capnic in Siebenbürgen.* Chemie der Erde, 1940, vol. 13, pp. 50–63, 7 figs.

Masses of green material in the andesites are soft and earthy or hard and jaspery. They consist of quartz, augite (from the andesites), chlorite, pyrite, and an amorphous groundmass, and were deposited as a gel by hydrothermal action. Analysis gave SiO_2 88·55, Al_2O_3 1·99, FeO 1·45, MgO 1·36, CaO 3·74, H_2O+ 2·20, H_2O- 0·65, S trace = 99·94. L. J. S.

Thiele (Erich). *Die Beziehung der chemischen Zusammensetzung zu den physikalisch-optischen Eigenschaften in einigen Mineralien des Kontakts.* Chemie der Erde, 1940, vol. 13, pp. 64–91, 13 figs.

Optical studies have been made and densities determined on 7 analysed samples of staurolite, 4 of chondrodite, one humite, and 7 of cordierite. From these results and the literature data graphs of the variations in optical properties and density with chemical composition have been made. M. H. H.

Selivanov (L. S.) Селиванов (Л. С.). *Chlorine and bromine in massive crystalline rocks.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 28, pp. 809–813.

In 23 plutonic rocks of various types the average content of chlorine is $3{\cdot}14\times10^{-2}$ % and of bromine $1{\cdot}62\times10^{-4}$ %. In meteorites values of the same order were obtained. Dashkesanite [M.A. **6**–438] contains Cl 3·25 %, Br $2{\cdot}9\times10^{-4}$ %. L. J. S.

Taddei (C.). *Pegmatiti della Svizzera Italiana e minerali in esse contenuti.* Schweiz. Min. Petr. Mitt., 1940, vol. 20, pp. 247–252.

Pegmatite intrusions in gneiss and schists are frequent in the southern part of Ticino (= Tessin). Minerals that have been recorded in them include tourmaline, beryl, garnet, scapolite, torbernite, purpurite, vivianite, graftonite, fuchsite, orthite, columbite, tapiolite, and dumortierite. L. J. S.

Casasopra (S.). *Studio petrografico dello gneiss granitico Leventina (Valle Riviera e Valle Leventina, Canton Ticino).* Schweiz. Min. Petr. Mitt., 1939 [i.e. 1940], vol. 19 (for 1939), pp. 449–710, 8 pls., 70 text-figs.

Intercalation of other rocks and differentiation of the granite-gneiss are discussed in elaborate detail. Chemical analyses are given of 15 rocks, and of garnet, beryl, and tourmaline together with optical data. L. J. S.

Bemmelen (R. W. van). *Granitische intrusies in het Zuidergebergte van West-Java.—Granitic intrusions in the southern mountains of West-Java.* (English summary.) De Ingenieur in Nederlandsch-Indië, Sect. 4, 1941, vol. 8, pp. 9–18, 2 pls., 7 text-figs.

The study of quartz-diorite and granodiorite intrusions into hydrothermally altered andesites in the Bandoeng district of Java, leads the author to the conclusion that the dioritic rocks were formed under the influence of ascending magmatic emanations. [M.A. **8**–32.] S. I. T.

Jugovics (Lajos). *A Sulyomtető aszfaltnyomokat tartalmazó andezitje a Cserháthegységben.* Mat. Term.-tud. Értesitő, Budapest, 1940, vol. 59, pp. 275–289, 1 pl., 44 text-figs.

Jugovics (Ludwig). *Der Asphaltspuren führende Andesit des Sulyomtetö im Cserhát-Gebirge (Ungarn).* Schweiz. Min. Petr. Mitt., 1939 [i.e. 1940], vol. 19 (for 1939), pp. 310–324, 6 figs.

Andesite dikes on Mt. Sulyomtető traverse Helvetian (Miocene) marls containing beds of coal. Cavities in the andesite, lined with crystals of quartz and calcite and impregnated with pyrite, contain asphalt in amounts up to 0·1 litre. Andesite-tuff, forming the main mass of Mt. Sulyomtető, contains chalcedony, marcasite partly altered to melanterite, and gypsum. V. Z.

Nockolds (Stephen Robert). *The Garabal Hill–Glen Fyne igneous complex.* Quart. Journ. Geol. Soc. London, 1941, vol. 96, pp. 451–511, 2 pls., 11 text-figs.

This stock, covering 12½ sq. miles NW. of Loch Lomond, consists of a series of intrusions from earlier ultrabasic rocks, through gabbros and diorites, to later aplite and pegmatite. Petrographical descriptions with many chemical analyses are given of the several rock types, together with optical data for the constituent minerals. It is concluded that the various types originated by crystallization-differentiation from a parent magma now represented in the complex by pyroxene-mica-diorite. Certain types show contamination with the earlier basic rocks; and the surrounding schists have suffered thermal metamorphism. The following mineral analyses are given: I, augite from augite-peridotite; II, brown hornblende from davainite; III, green-brown hornblende from appinitic diorite; IV, pale green hornblende from gabbro; V, cummingtonite from contaminated granodiorite. Other partial analyses are given of hornblendes and biotites.

	SiO_2.	TiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MnO.	MgO.	CaO.	Na_2O.	K_2O.
I.	51·20	0·91	3·01	2·46	5·32	trace	15·48	20·73	0·34	—
II.	42·09	2·34	11·57	4·02	8·72	0·08	14·79	11·80	2·06	0·63
III.	41·61	2·57	12·16	4·04	12·05	trace	11·44	11·63	1·85	0·58
IV.	48·40	1·08	7·27	2·44	9·53	0·10	15·86	11·25	1·90	0·17
V.	50·87	nil	3·46	0·10	22·90	nil	21·18	0·68	—	—

	H_2O+.	H_2O-.	Total.	Sp. gr.	α.	β.	γ.	2V.	γ : c.
I.	0·51	0·57	100·53	—	1·680	1·686	1·705	61°	46°
II.	2·03	0·06	100·19	—	1·652	1·669	1·677	75	26
III.	2·33	0·21	100·47	—	1·658	1·674	1·683	78	23
IV.	1·71	0·37	100·08	—	1·629	1·642	1·652	81	25
V.	1·58		100·77	—	1·635	1·644	1·656	82	19

L. J. S.

Tomkeieff (Sergei Ivanovich) & Marshall (Charles Edward). *The Killough-Ardglass dyke swarm.* Quart. Journ. Geol. Soc. London, 1940, vol. 96, pp. 321–338, 2 pls., 1 text-fig.

Numerous dikes of Tertiary age outcropping on the coast of Co. Down consist of olivine-dolerite, a finer-grained olivine-basalt, spilite, and alkalic trachybasalt. Two prominent dikes near St. John's Point contain large phenocrysts of labradorite [Min. Mag. **16**–264, **20**–93, **21**–543]. Associated with this swarm are kersantite dikes of Caledonian age

which contain pseudomorphs of pennine after biotite. Chemical analyses are given of these rocks. L. J. S.

Benson (W. N.) & Turner (F. J.). *Mugearites in the Dunedin district.* Trans. Roy. Soc. New Zealand, 1940, vol. 70, pp. 188–199, 2 figs.

The mugearites differ from the associated basalts in the greater alkalinity of the felspar (andesine $An_{48}-An_{37}$) and the predominance of olivine (Fa_{40}) over pyroxene (diopsidic augite). A chemical analysis of the rock agrees closely with that of the original mugearite from Skye. Some anomalies in the optical orientation of the felspar are possibly due to high potash content. L. J. S.

Hoppe (Hans-Jürgen). *Untersuchungen an Basaltgläsern.* Chemie der Erde, 1940, vol. 13, pp. 206–211.

Eight specimens of basalt glass (including tachylyte and siderome-lane) from various localities gave n 1·586–1·677, d 2·779–2·982, SiO_2 46·1–51·9 %. L. J. S.

Afanassiev (V. A.) Афанасьев (В. А.). *Alkaline rocks of the Ozernaya varaka of the Khabozero region (south-western part of the Kola peninsula).* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 25, pp. 508–512.

A small (1 sq. km.) outcrop discovered in 1935 consists in the centre of pyroxenite (with 70–82% titanaugite) and melteigite, grading into an outer zone of ijolite with urtite and cancrinite-syenite. The contact zone consists of fenite, pyroxene-carbonate-rocks, and carbonatites. Ten detailed chemical analyses are given. L. J. S.

Afanassiev (V. A.) Афанасьев (В. А.). *Olivinites of the Khabozero region (south-eastern part of the Kola peninsula).* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 25, pp. 513–516.

In the intrusion (20 sq. km.) of the Lesnaya varaka the central part (12 sq. km.) consists of olivine-rocks containing up to 98·7 % of olivine, grading into ore-olivinites with up to 81·1 % of titaniferous magnetite and accessory perovskite. One type contains olivine 56·3, titaniferous magnetite 25·1, perovskite 18·6 %. Veins in these rocks are composed of kolskite [M.A. 7–370], analysis of which is given as SiO_2 40·32, Al_2O_3 0·76, Fe_2O_3 1·82, MgO 36·27, CaO 2·44, CO_2 3·35, H_2O 15·39 = 100·35. An outer zone consists of pyroxenite and pyroxene-felspar-rocks, and

at the contact a 10–12 m. zone of fine-grained rocks containing pyroxene, melanite (35–47 %), felspars, nepheline, &c. The adjacent orthogneisses are for a distance of 10–15 m. converted into syenites containing perthite (75–80 %), pyroxene (10–15 %), &c. Eleven detailed chemical analyses of these rocks are given. [M.A. 7–301, 454.] L. J. S.

Wang (Heng Sheng). *Petrographische Untersuchungen im Gebiet der Zone von Bellinzona.* Schweiz. Min. Petr. Mitt., 1939, vol. 19, pp. 21–199, 1 pl., 32 text-figs.

A dissertation on the amphibolite rocks which grade into eclogite and are regarded to be of magmatic origin. Some contain anthophyllite, and at the contacts diopside, epidote, and scapolite are developed. Optical data are given of the minerals. From several chemical analyses of the rocks and micrometric measurements the composition of the contained hornblende is calculated [to two places of decimals, as if they were genuine analyses!]. These results, together with numerous other recalculated analyses of amphiboles, are plotted with the composition of the rocks. Composition of the garnets (deduced from n and d) is similarly plotted. Water determinations and the dehydration of amphiboles are discussed. In connexion with pegmatite and aplite intrusive into the amphibolites general remarks are made on the relations of the felspars. L. J. S.

Prider (Rex T.). *Cordierite-anthophyllite rocks associated with spinel-hypersthenites from Toodyay, Western Australia.* Geol. Mag. Hertford, 1940, vol. 77, pp. 364–382, 5 figs.

A large (180 × 100 feet) xenolith in granite-gneiss consists largely of cordierite-anthophyllite rocks together with other mineral assemblages —olivine-spinel-anthophyllite-hypersthene, spinel-anthophyllite-hypersthene, cordierite-anthophyllite-clinochlore, corundum-pleonaste-magnetite-cordierite-anthophyllite-clinochlore, &c. Optical data are given for the several minerals: for cordierite, α 1·542, γ 1·550, 2V large, negative; for anthophyllite, α 1·647, γ 1·663, 2V near 90°. Adjoining these rocks is a lens of amphibolites with hypersthene, cordierite, anthophyllite, olivine, spinel, corundum, biotite, and clinochlore, analyses of which show SiO_2 31 % with high Al_2O_3, MgO, and FeO. It is suggested that the cordierite-anthophyllite rocks are the result of contamination of ultra-basic magma by aluminous material, rather than of magnesia metasomatism as in similar rocks from Cornwall [Min. Mag. **24**–181]. L. J. S.

Turner (F. J.). *Structural petrology of the schists of eastern Otago, New Zealand.* Amer. Journ. Sci., 1940, vol. 238, pp. 73–106, 153–191, 83 figs.

A detailed study with the aid of many petrofabric diagrams of the stages in the transformation of greywacke into schists composed of mica, chlorite, stilpnomelane, and quartz. The associated gold-quartz veins were formed during the later stages of metamorphism. L. J. S.

Hutton (C. Osborne). *The significance of tourmaline in the Otago schists.* Trans. Roy. Soc. New Zealand, 1939, vol. 68, pp. 599–602.

The several modes of occurrence of tourmaline, together sometimes with scheelite and metallic sulphides, in these schists suggest that it is of pneumatolytic origin from the underlying granite batholith, rather than that the boron was originally present in the sedimentary rocks from which the schists were derived. L. J. S.

Lyons (John B.). *Metamorphism of sediments of the deep well near Wasco, California, and of the deeply buried Eocene sediments near Ventura, California.* Journ. Geol. Chicago, 1940, vol. 48, pp. 436–443.

Cores of Eocene arkosic sandstone from a depth of 15,004 feet (the world's deepest drill hole) near Wasco show that the recrystallization of kaolinite is the only metamorphic effect produced by the subjection of sediments to pressure of 55,000 lb. per sq. inch and temperature of 145° C. Similar sediments from Ventura, which have been even more deeply buried, have only minor amounts of sericite, chlorite, and epidote as metamorphic products. L. J. S.

Kuenen (Ph. H.). *Geochemical calculations concerning the total mass of sediments in the earth.* Amer. Journ. Sci., 1941, vol. 239, pp. 161–190.

The total thickness of sediments is about 3 km. and the volume 13×10^8 cu. km. Oceanic deposits accumulate at the average rate of 1 cm. in 6000 years. The average chemical compositions of different types of sediments are tabulated, and the geochemistry of Ca, Si, Mn is considered. L. J. S.

Bramlette (M. N.). *The stability of minerals in sandstone.* Journ. Sedim. Petr., 1941, vol. 11, pp. 32–36.

Apart from ordinary weathering, some minerals, especially those of

the ferro-magnesian group, are liable to become corroded in sandstones; and the absence of these, especially in the older rocks, cannot be taken as an indication of the source of the material. An example is described of a sandstone of Miocene age in California in which hornblende and epidote have disappeared. L. J. S.

Versey (Henry Cherry). *The petrography of the Permian rocks of the southern part of the Vale of Eden.* Quart. Journ. Geol. Soc. London, 1939, vol. 95, pp. 275–298.

The relative abundance of heavy minerals (zircon, rutile, tourmaline, garnet, anatase, &c.) in the different beds is recorded, and suggestions offered as to the source of the material. The red coloration and siliceous cementation of the rocks are considered in connexion with climatic conditions. L. J. S.

Stewart (Duncan, *Jr.*). *Notes on some Marie Byrd Land rocks.* Amer. Min., 1941, vol. 26, pp. 42–49, 1 fig.

A petrographic study of many metamorphic and sedimentary rocks from the Edsel Ford Ranges, Antarctica, shows that with the exception of gneisses the majority of the metamorphic rocks were originally sedimentary rocks. F. A. B.

Bezrukov (P. L.) Безруков (П. Л.). *On the contact metamorphism of phosphorites.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 24, pp. 282–284.

Phosphorite beds (16–25 m. thick) between Silurian dolomites in the Teshiktass anticline of the Kara-Tau range, Kazakhstan, are intruded by granite and then altered to light coloured, finely-crystalline apatite-rocks with some admixed calcite and silicate minerals. L. J. S.

Economic Minerals and Ore-Deposits

Ingerson (Earl) & Morey (George W.). *Nature of the ore-forming fluid: a discussion.* Econ. Geol., 1940, vol. 35, pp. 772–785.

Fenner (C. N.). *Ditto.* Ibid., pp. 883–904.

Discussion of the article by L. C. Graton [M.A. 8–36]. M. A. P.

Macgregor (M.). *Synopsis of the mineral resources of Scotland.* Special Reports on the Mineral Resources of Great Britain, Mem. Geol. Survey, 1940, vol. 33, 59 pp., 1 fig. Price 1*s.*

Information is given of the nature, distribution, and uses of various economic minerals, together with references to sources from which more detailed information can be obtained. L. J. S.

Hallimond (A. F.) & Butler (A. J.). *Magnetic survey over haematite ore, Newton mine, Furness.* Wartime Pamphlet, Geol. Surv. Great Britain, 1940, no. 1, 4 pp., 3 figs.

Kennedy (W. Q.). *British sources of alkali feldspar.* Ibid., 1940, no. 2, 16 pp., 7 figs.

—— Hallimond (A. F.), & Harvey (C. O.). *Electro-magnetic separation tests on Scottish alkaline syenites.* Ibid., 1941, no. 2, Supplement no. 1, 4 pp.

Haldane (D.), Eyles (V. A.), & Davidson (C. F.). *Diatomite.* Ibid., 1940, no. 5, 13 pp., 2 figs.

Kennedy (W. Q.). *Dolomite and brucite-marble in the Scottish highlands.* Ibid., 1940, no. 6, 11 pp., 6 figs. (maps).

—— *Additional information concerning brucite-marble in Skye.* Ibid., 1941, no. 6, Supplement no. 1, 5 pp., 3 figs.

Anderson (J. G. C.). *High-grade silica rocks of the Scottish Highlands and islands.* Ibid., 1940, no. 7, 8 pp., 3 figs.

Hawkins (H. L.). *British phosphates, Part I. Phosphatic chalk of Taplow.* Ibid., 1940, no. 8, 6 pp., 5 figs.

Oakley (K. P.) & Dines (H. G.). *British phosphates, Part II. Phosphorites of Lower Cretaceous age in Lincolnshire and of Ordovician age in Montgomeryshire.* Ibid., 1940, no. 8, 18 pp., 4 figs.

Oakley (K. P.). *British phosphates, Part III. Lower Cretaceous phosphorites, Isle of Wight to Yorkshire, with supplementary notes on Lincolnshire.* Ibid., 1941, no. 8, 26 pp., 6 figs.

Wilson (G. V.) & Phemister (J.). *Talc, other magnesium minerals and chromite, associated with British serpentines.* Ibid., 1941, no. 9, 24 pp., 8 figs.

Anderson (J. G. C.), with analyses by Muir (A.). *Limestones of Scotland. Area VI. Banffshire and the north-east Grampians.* Ibid., 1941, no. 13, 14 pp., 5 figs.

Dunham (K. C.). *Iron ore deposits of the northern Pennines.* Ibid., 1941, no. 14, 30 pp., 4 figs.

Dunham (K. C.) & Rose (W. C. C.). *Geology of the iron-ore field of south Cumberland and Furness.* Ibid., 1941, no. 16, 26 pp., 4 figs. Price 1*s.* 3*d.*

This series of pamphlets follows the lines of the 'Special Reports on the Mineral Resources of Great Britain' [M.A. 1–84] issued by the Geological Survey during the war of 1914–18, but on a less elaborate scale. They are mimeographed foolscap sheets, and the figures (mostly maps) are photographs pasted in. Except for the one pamphlet that is priced, they are available only on loan. Up-to-date details are given of the home resources of various economic minerals. Other numbers, not listed above, deal with water supply. L. J. S.

Johnstone (Sydney J.). *Empire mineral resources and their relation to the war effort.* 23rd Streatfeild Memorial Lecture, 1940, Inst. Chem. London, 1941, 85 pp., 3 figs.

A useful summary is given of the applications and production in the several countries of the British Empire of mineral products grouped under the following headings: mineral fuels, iron and ferro alloy minerals, base-metal minerals, precious metals and stones, minerals for chemical industries, industrial earths and clays, and miscellaneous non-metallic minerals. The information given is a condensed summary of that in the publications of the Mineral Resources Department of the Imperial Institute. Some minerals are exported in larger or smaller amounts, while some others have to be imported, especially antimony, borates, mercury, molybdenum, petroleum, potash, pyrite, and native sulphur. During 1938 the value of the Empire output amounted to £517,000,000, of which 41·57 % was contributed by the United Kingdom, mainly as coal (87·8 %). A statistical table and graphs compare the Empire production with the world production. Some developments since 1914 are described, and a concluding note mentions government assistance to the overseas mining industry. L. J. S.

Arkell (W. J.). *Mineral resources of continental Europe.* Nature, London, 1941, vol. 147, pp. 404–407, 443–446.

Notes on the resources of various minerals of strategic importance in the several countries, with a list of references to literature from which the information has been collected. L. J. S.

Fox (Cyril S.). *Review of the mineral industry of India and Burma during 1938.* Rec. Geol. Surv. India, 1939, vol. 74, pp. 279–371.

A continuation of previous annual reports, with statistics. The total

value produced in 1938 was in India 25½ and in Burma 7½ million pounds sterling. The yield of diamond amounted to 1729 carats, nearly all from Panna State; and there was an increased production of ruby in Burma. Zinckenite (31 tons) is reported from Shogar in Chitral State.

L. J. S.

Krishnan (M. S.). *The mineral resources of the Central Provinces and Berar.* Rec. Geol. Surv. India, 1939, vol. 74, pp. 386–429, 1 pl. (map.)

Revision of previous reports by L. L. Fermor (1911 and 1927). A wide range of economic minerals is listed, with a useful map and bibliography.

L. J. S.

Keys (M. R.). *Paragenesis in the Hollinger veins.* Econ. Geol., 1940, vol. 35, pp. 611–628, 6 figs.

The ore-bodies of the Hollinger gold mine, Porcupine district, Ontario, lie in folded and altered Keewatin lavas intruded by stocks of quartz-feldspar-porphyry now largely altered to sericite-schist. In the central (productive) zone several periods of fracturing and mineralization gave the following sequence: ankerite, tourmaline, scheelite; albite, and pyrite in the wall-rocks; abundant carbonates and pyrite, also arsenopyrite; abundant quartz followed by pyrrhotine, blende, chalcopyrite, galena, petzite, hessite, tetradymite, sericite, gold; quartz, calcite, blende, chalcopyrite, sericite, gold. Photomicrographs show veinlets and blebs of gold associated with ankerite, quartz, and pyrite.

M. A. P.

Gallagher (David). *Albite and gold.* Econ. Geol., 1940, vol. 35, pp. 698–736.

An extensive review of the literature reveals many cases of gold deposits associated with albitic igneous rocks. Such deposits appear to contain little silver and few sulphides, whereas gold deposits related to potash-rich igneous rocks seem to be argentiferous and to contain abundant sulphides. It is suggested that the trondhjemitic (sodic) and the granitic (potassic) rock suites, with their respective pegmatites and gold deposits, were derived from distinct parental magma-types.

M. A. P.

Byers (A. Roddick). *Geology of the Nighthawk peninsular gold mine.* Econ. Geol., 1940, vol. 35, pp. 996–1011, 9 figs.

The mine lies on North peninsula, Nighthawk lake, 10 miles E. of Porcupine, Ontario, in a region of Keewatin augite-andesites which were intruded by albite-syenite and albite-syenite-porphyry and traversed by basic dikes. Gold occurs in a 600-foot quartz vein and in sheared and altered zones in the andesite and the syenite. The deposits consist mainly of pyrite, with some arsenopyrite, cobaltite, chalcopyrite, blende, petzite, and visible gold in abundant ankerite, quartz, and sericite, with fuchsite, chlorite, calcite, albite, and tourmaline. These minerals were deposited from magmatic solutions, at intermediate temperatures, after the syenite intrusion and before the basic dikes.

M. A. P.

Sevensma (P. H.). *Les gisements d'or de la région de Saint-Yrieix (Haute-Vienne, France).* Genève (Georg & Cie.), 1941, 123 pp., 4°, 4 pls., 61 text-figs.

This privately-printed dissertation gives a detailed account of the rocks and of the several gold mines that have been worked since Gaulo-Roman times. The gneisses with amphibolite and serpentine of the Central Plateau of France are penetrated by microgranite, auriferous quartz veins, and porphyrites. Sulphides associated with the gold are mispickel, pyrite, blende, galena, chalcopyrite, tetrahedrite, bournonite, and jamesonite. The annual production of gold in the Saint-Yrieix district amounts to about 450 kg.; in 1938 for the whole of France the production was 2717 kg., the larger part of which came from Saisigne mine, near Carcassonne, dep. Aude. [M.A. **8**–38.] L. J. S.

Vendl (M[iklós]). *Die technisch wichtigen Mineralschätze Ungarns mit Ausnahme der Kohlen und Erdöle vor und nach dem Zusammenbruch.—La richesse minérale—importante du point de vue technique—de la Hongrie d'avant-guerre et d'après-guerre non compris charbon et huile.—The technically important mineral wealth of pre-war and post-war Hungary, coal and oil excepted.* Publ. Dept. Mining and Metallurgy, Univ. Sopron, 1938, vol. 10, pt. 3, pp. 105–304. (German with French and English summaries.)

An excellent and clearly arranged summary of geological, genetic, and economic data relating to the technically important mineral deposits of Hungary, with an enumeration of their minerals. V. Z.

Koch (Sándor). *Adatok Rudbánya oxidációs övének ásványaihoz.*—Koch (Sándor). *Beiträge zur Kenntnis der in der Oxidationszona von Rudabánya vorkommenden Minerale.* Mat. Term.-tud. Értesitő, Budapest, 1939, vol. 58, pp. 868–879 (Hungarian), pp. 880–882 (German summary), 2 pls.

Genetic, chalcographic, and crystallographic relations of the several accessory minerals occurring in the iron ore deposit consisting of limonite and chalybite at Rudabánya, com. Borsod, viz. native copper (crystal-forms *o a*), mercury, and gold, pyrite, cinnabar, chalcopyrite, bornite, tetrahedrite, galena, chalcosine, covelline, cuprite (*o d a n*), quartz (*m r z*), calcite, malachite (*a c m*), chessylite, baryte, and anglesite (*a m d l*) [Dana's letters]. V. Z.

Sztrókay (Kálmán). *A gyöngyösoroszi-i ércelőfordulás mikroszkopiai vizsgálata.*—Sztrókay (K. v.). *Erzmikroskopische Beobachtungen am Erzvorkommen von Gyöngyösoroszi.* Mat. Term.-tud. Értesitő, Budapest, 1939, vol. 58, pp. 904–916 (Hungarian), p. 917 (German summary), 2 pls.

The veins of sulphidic ores of extrusive-hydrothermal origin in propylitized andesite at Gyöngyösoroszi are closely connected with other ore-deposits of late volcanic origin in the inner border of the Carpathians. The main ores at Gyöngyösoroszi are blende and galena, with associated pyrite, marcasite, chalcopyrite, and stibnite, and small amounts of covelline, tetrahedrite, bournonite, boulangerite, jamesonite (?), and miargyrite (?). Gangue minerals are quartz of different varieties, calcite, dolomite, chalybite, fluorite, and baryte. The propylitization of the Hungarian andesites is much earlier than the formation of the ore-deposits, and the two are not due to the same cause. V. Z.

Papp (Ferenc). *Néhány szarvaskői ásványról.*—Papp (F.). *Über einige Mineralien von Szarvaskő (Kom. Heves).* Mat. Term.-tud. Értesitő, Budapest, 1939, vol. 58, pp. 918–926, 6 pls., 1 text-figure. (Hungarian only.)

Wehrlite from Szarvaskő contains the following magmatic ore-minerals, in the order of their crystallization: chalcopyrite, pyrite, pyrrhotine, magnetite, haematite, and ilmenite. Pyrite and haematite are also found as epigenetic hydrothermal minerals; the first in diabase and gabbro and the second in quartzite. Other minerals are psilomelane and anthracite in clay-slate, and hydrothermal quartz (crystals up to 5·6 cm.) at the contact of diabase and quartzite. V. Z.

Schwartz (G. M.) & Ronbeck (A. C.). *Magnetite in sulphide ores.* Econ. Geol., 1940, vol. 35, pp. 585–610, 16 figs.

In 130 described districts magnetite occurs as an ore-mineral in association with one or more of the following: chalcopyrite, pyrite, pyrrhotine, blende, galena, arsenopyrite, chalcosine, bornite, &c. In 52 of these districts previous work indicates the order of formation of the principal ores. With few exceptions magnetite formed first and therefore at a relatively high temperature, as recognized by W. Lindgren. A bibliography with 113 titles is given. M. A. P.

Moore (Charles H., *Jr.*). *Origin of the nelsonite dikes of Amherst county, Virginia.* Econ. Geol., 1940, vol. 35, pp. 629–645, 4 figs.

These frequently described bodies composed largely of ilmenite and apatite occur, associated with anorthosite, in dikes following the foliation of the Lovingston quartz-mica-gneiss, which is an altered quartz-monzonite. The gneiss was intruded by the hypersthene-granodiorite which elsewhere forms the core of the Blue Ridge mountains. The nelsonite and the anorthosite are genetically related to the granodiorite; but although the gneiss and the nelsonite dikes show hydrothermal alteration the nelsonite bodies are probably not of purely hydrothermal origin. [M.A. **6**–300.] M. A. P.

Shilin (L. L.) Шилин (Л. Л.). *Shishimskite (perovskite-spinel magnetite) from the Praskovie-Eugenievsky mine in the Shishim Mts., south Urals.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 28, pp. 346–349.

The ore veins in the Shishim Mts. are of three types: (1) Magnetite at the contact of gabbro and limestone with chlorite-serpentine-rocks. (2) Titaniferous magnetite in the gabbro. (3) Perovskite-spinel-magnetite ores at the gabbro-limestone contact, consisting of 13·24 % perovskite (*n* 2·375), 15·16 % spinel (*n* 1·724), and 71·6 % magnetite and haematite. This new type of ore is called shishimskite. Calculated from a chemical analysis it contains 23·15 % perovskite, 27·03 % spinel, and 49·85 % magnetite. L. J. S.

Hutton (C. Osborne). *The titaniferous ironsands of Patea, with an account of the heavy residues in the underlying sedimentary series.* New Zealand Journ. Sci. Techn., Sect. B, 1940, vol. 21, pp. 190B–205B, 1 pl., 5 text-figs.

The iron-sands, estimated to amount to $12\frac{1}{4}$ million tons, occur in

dunes, river terraces, and on the sea-shore near Patea, Taranaki, New Zealand. They consist of titaniferous magnetite (TiO_2 averaging 10 %) with pyroxenes, amphiboles, and plagioclase, and smaller amounts of quartz, zircon, apatite, and garnet. Examination of the heavy residues (which include pumpellyite, sapphirine?, &c.) from the underlying Tertiary beds of sands and clays point to these being the immediate source of the material, while various suggestions are made as to their primary source. L. J. S.

Krishnan (M. S.) & Ghosh (P. K.). *Manganese-ore in Bamra State.* Rec. Geol. Surv. India, 1941, vol. 75 (for 1940), Prof. Paper no. 8, 22+iv pp., 3 pls.

Lumps of limonite and low-grade manganese ore occur in laterite overlying schistose rocks near Pukhura (21° 35½′ N., 84° 17′ E.). Eleven analyses show MnO 17·80–48·25, Fe_2O_3 21·60–49·92, BaO 0·30–4·38 %, &c. Minerals identified on polished sections include magnetite, haematite, limonite, goethite, polianite, pyrolusite, psilomelane, and chalcophanite. L. J. S.

Caesar (F.) & Konopicky (K.). *Chromerz.* Chemie der Erde, 1940, vol. 13, pp. 192–205, 2 figs.

Analyses of chrome ores from Transvaal, Rhodesia, Bulgaria, Greece, and Turkey show Cr_2O_3 39·4–52·0 % with up to 15 % SiO_2. The admixed silicate was extracted by cold dilute HF (which has only slight action on the chromite), and analyses point to this being usually a chlorite, rarely serpentine. The composition of the chromite ranges from $3MgO.FeO.R_2O_3$ to $MgO.FeO.R_2O_3$. When the ore is burnt, FeO is oxidized to Fe_2O_3, which combines with the MgO of the silicates giving spinel. L. J. S.

Iyer (L. A. N.). *The chromite deposits in the Ratnagiri district and Savantvadi State, Bombay Presidency.* Rec. Geol. Surv. India, 1939, vol. 74, pp. 372–385, 1 pl., 3 text-figs.

Chromite occurs as irregular veins and lenses in serpentine near Kankanli and near Vagda. Grains (1–2 mm.) mostly euhedral or subhedral are embedded in a matrix of chlorite. Analyses show Cr_2O_3 30–39 %. A reserve of 67,000 tons is estimated. L. J. S.

White (D. E.). *The molybdenite deposits of the Rencontre East area, Newfoundland.* Econ. Geol., 1940, vol. 35, pp. 967–995, 7 figs.

These deposits occur in the southern border of the Palaeozoic Ackley

batholith, which invaded the Ordovician(?) Belle bay volcanics on the north side of Fortune bay. In the mineralized area the batholith is mainly albitized red alaskite (analysis I) with a marginal phase of miarolitic aplite (analysis II, both by R. Folinsbee) in which most of the molybdenite is concentrated. At Ackley city muscovitized aplite (analysis III) or molybdenite-aplite (analysis IV, both by R. B. Ellestad) contains disseminated molybdenite, fluorite, &c. At Wylie hill abundant low-grade molybdenite occurs in thin quartz-pyrite-molybdenite joint-coatings in aplite. To explain the mineralization, acid gases or liquids are preferred to alkaline fluids.

	SiO_2.	TiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MgO.	CaO.	Na_2O.	K_2O.	H_2O+.	H_2O-.	Total.
I.	79·07	0·11	11·65	0·36	0·28	0·16	0·09	3·45	4·46	0·25	0·06	99·94
II.	77·33	0·09	12·56	0·17	0·73	0·12	0·45	3·90	4·54	0·28	0·03	100·20
III.	48·93	0·16	26·49	2·68	3·64	0·49	1·46	1·36	9·31	3·09	0·04	
IV.	75·05	0·13	11·13	0·26	0·57	0·14	0·54	1·92	6·43	0·21	0·01	

	P_2O_5.	F.	S.	MnO.	Mo.
III.	0·01	1·38	1·27	0·42	0·19 (less 1·01 O_2) = 99·91
IV.	0·02	0·35	1·49	0·04	1·99 (less 0·21 O_2) = 100·07.

M. A. P.

Stenzel (H. B.) & Barnes (Virgil E.). *A bismuth-molybdenum prospect (Kiam prospect) of Llano County, Texas.* Univ. Texas Publ., 1940, no. 3945, pp. 911–922, 1 pl., 3 text-figs.

Pre-Cambrian schists were intruded by gneiss and later by granite-pegmatite which grades into quartz veins and lenticles. The felspar of the pegmatite has been penetrated along cleavages by a dusty impregnation of native bismuth with some bismuthinite and flakes of molybdenite, the felspar being replaced by sericite and calcite. L. J. S.

Ladame (Georges Ch.). *Le minerai oxydé de la mine d'or et de plomb argentifère du Bolkardaǧ, Turquie.* Schweiz. Min. Petr. Mitt., 1938, vol. 18, pp. 404–428, 5 figs.

The Bolkar-Maden mines on Bolkardag, a part of the Taurus Mts. in SE. Anatolia, are worked in alluvial deposits derived from veins in limestone penetrated by dikes of quartz-porphyry and porphyrite. The ore is a sandy mixture of oxidized minerals: cerussite, anglesite, mimetite, plumbojarosite, hemimorphite, smithsonite, aurichalcite, limonite, and goethite. Yellow, earthy and friable plumbojarosite from Saribaşyukari gave SO_3 19·90, Al_2O_3 2·15, Fe_2O_3 41·12, PbO 22·30, Ag_2O 0·077, ZnO 0·71, CuO 0·31, MgO 0·40, CaO 0·59, Na_2O trace, K_2O 1·10, As_2O_5 2·00, SiO_2 0·35, H_2O 7·10 = '98·47', Au 12 g./t,

sp. gr. 3·6, ϵ 1·722, ω 1·9. Deducting mimetite and jarosite, this agrees with $PbO.3Fe_2O_3.4SO_3.6H_2O$. L. J. S.

Ahlfeld (F.), Mosbach (R.), & Oehmichen (H.). *Zinnerzvorkommen in der Provinz Hunan (China).* Neues Jahrb. Min., Abt. A., 1938, Beil.-Bd. 73, pp. 327–351, 4 pls., 1 text-fig.

The district south of Changsha yielded 800 tons of tin in 1912 and 90 tons in 1934. The ore occurs as pipes in limestone and consists of cassiterite and mispickel, with some wolframite, pyrite, Cu, Pb, and Zn minerals, and native bismuth. Descriptions are given of a series of specimens collected by the third author. Microscope sections of one show a mineral similar to the magnesium borate from Beatrice mine, Malaya [M.A. **5**–63, **8**–46]. L. J. S.

Dreyer (Robert M.). *The geochemistry of quicksilver mineralization.* Econ. Geol., 1940, vol. 35, pp. 905–909.

Discussion of paper by R. M. Dreyer [M.A. **8**-42]. M. A. P.

Anderson (Richard J.). *Microscopic features of ore from the Sunshine mine.* Econ. Geol., 1940, vol. 35, pp. 659–667, 12 figs.

This mine, in the canyon of Big creek, between Wallace and Wardner, Coeur d'Alene district, Idaho, is the leading silver producer in the United States. Lying in folded and faulted quartzitic and calcareous shales of the St. Regis formation (Algonkian) the generally massive ore is composed of pyrite, arsenopyrite, argentiferous tetrahedrite, galena, bournonite, and chalcopyrite formed in this order in a gangue of chalybite and quartz. Polished sections show no visible silver minerals in the tetrahedrite. M. A. P.

Evans (David Lecount). *Structure and mineral zoning of the Pailaviri section, Potosi, Bolivia.* Econ. Geol., 1940, vol. 35, pp. 737–750, 5 figs.

Field and laboratory observations suggest three periods of mineralization: pyrite, arsenopyrite, quartz, with wolframite and bismuthinite at greater depth; quartz, cassiterite, pyrite; quartz, chalcopyrite, stannite, with silver-bearing sulphides at higher levels. M. A. P.

Butler (Robert D.) & Singewald (Quentin D.). *Zonal mineralization and silicification in the Horseshoe and Sacramento districts, Colorado.* Econ. Geol., 1940, vol. 35, pp. 793–838, 28 figs.

These districts, in Park county, near the Alma and Leadville districts, yielded $300,000 from 1870 to 1900. The ore-bodies are small lead-silver replacement deposits in the Palaeozoic (pre-Pennsylvanian) Dyer and Leadville dolomites. The generalized history of the mineralization is as follows: brecciation and recrystallization of the country-rock accompanied by the deposition of baryte, jasperoid silica (later recrystallized), dolomite, manganiferous ankerite, ferruginous dolomite, quartz, pyrite, blende, galena, tennantite (yielding Ag), and small amounts of chalcopyrite, luzonite, argentite, and calcite. M. A. P.

Barsanov (G. P.) & Borovik (S. A.) Барсанов (Г. П.) и Боровик (С. А.). О редких элементах в рудах Малого Кавказа.—*On the rare elements in the Little Caucasus ores.* Труды Инст. Геол. Наук, Акад. Наук СССР, Вып. 17, Мин.-Геохим. Сер. No. 4 [Trans. Inst. Geol. Sci., Acad. Sci. U.S.S.R., no. 17, Min.-Geochem. Ser. no. 4], 1940, pp. 19–31, 3 pls., 1 text-fig. (map). (Russian with English summary.)

The deposits of sulphide ores in the Little Caucasus belong to one genetic cycle and are connected with a late granodiorite intrusion. The character of the ores in the different veins is related to depth and distance from the intrusive mass. In the deeper zones with the tetrahedrite-blende type of ores there is a considerable accumulation of germanium. Higher indium values are confined to dark blende of an early generation, and cadmium is accumulated in late light-coloured blende. The deeper zones are characterized by Co, Fe, Cu, Ge, Mo, and the mesozones by Zn, Pb, Cu, Fe, Cd, In. L. J. S.

Bemmelen (R. W. van). *Bauxiet in Nederlandsch-Indië.* Verslagen en Mededeelingen betreffende Indische delfstoffen en hare toepassingen, Dienst van den Mijnbouw in Nederlandsch-Indië, Batavia, 1940, no. 23, 115 pp., 23 pls., 6 text-figs. Price f.2.75. (English summary, pp. 109–115.)

Aluminium-laterite composed largely of gibbsite is called bauxite when it can be used as an ore of aluminium. Occurrences on the islands of Bangka and Bintan are described. It has been formed, especially from pelitic shales, by lixiviating weathering processes in a wet tropical climate. L. J. S.

Sosedko (A. F.) Соседко (А. Ф.). *On the genesis of the Tamda emery deposits.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 25, pp. 493–495.

Emery occurs in lenses from several cm. up to 50 m. across in Silurian marble intruded by granite in the Tamda massif, Kara-Kalpak republic. It contains the following minerals in the order of their abundance: pyrophyllite, corundum, margarite, an unidentified amorphous mineral, gibbsite, rutile, chlorite, tremolite, limonite, biotite, andalusite, kaolin, diaspore, and rarely quartz and pyrite. Farther from the granite the material is oolitic and amorphous. Evidently here, as no doubt also in other parts of central Asia, the emery is a metamorphosed bauxite.

L. J. S.

Fróes Abreu (S.). *Kieselguhr nacional (diatomito)*. Rio de Janeiro (Inst. Nac. Tecn.), 1939, 71 pp., 16 pls., 13 text-figs. (maps, &c.).

An account is given of the uses and methods of preparation of diatomite, together with details of the deposits in various parts of Brazil. Many chemical analyses with determinations of density and porosity are also given. L. J. S.

Mansfield (George R.). *The rôle of fluorine in phosphate deposits.* Amer. Journ. Sci., 1940, vol. 238, pp. 863–879.

The phosphates in sedimentary deposits in the United States consist of fluor-apatite. The combination with fluorine renders the material insoluble. Modes of occurrence and distribution of fluorine are enumerated. It is suggested that volcanic activity provides a plentiful supply. The larger deposits occur above geological unconformities following a volcanic period. L. J. S.

Bhola (K. L.). *A short note on fuller's earth deposits of Jodhpur State, Rajputana.* Quart. Journ. Geol. Mining Metallurg. Soc. India, 1940, vol. 12, pp. 83–97, 1 pl.

A bed 4–10 feet thick of fuller's earth occurs at Kapurdi in a basin of Barmer (Cretaceous?) sandstone with ironstone and shale. Analysis gave SiO_2 47·00, Al_2O_3 23·30, Fe_2O_3 6·95, MgO trace, CaO 2·90, $Na_2O + K_2O$ 5·92, ign. 13·55 = 99·62. The production in the year 1938 amounted to 1737 tons. It is used locally mostly as a substitute for soap, and some is eaten. L. J. S.

Campbell (C. M.). *The coal reserves of Canada.* Econ. Geol., 1940, vol. 35, pp. 670–674.

The frequently quoted estimate of 1,234,000,000,000 [short] tons of

coal in Canada (International Geological Congress, 1913), is an absurd exaggeration. Against the Congress estimate of 5,793,000,000 tons on Vancouver island, J. D. MacKenzie placed the total amount at 26,000,000 tons; for Alberta, to which the Congress allotted 1,075,000,000,000 tons, J. A. Allan estimated 28,000,000,000 tons and later 20,000,000,000 tons. The smaller, more reliable estimates have been unjustifiably neglected.

M. A. P.

Miscellaneous

Subbaraman (P. R.) & Krishnaswami (K. R.). *A rapid volumetric method for estimation of iron and titanium and its application to ilmenite analysis.* Proc. Indian Acad. Sci., Sect. A, 1940, vol. 11, pp. 106–115.

The $KHSO_4$ fusion taken up with H_2SO_4 and reduced with zinc is titrated with solutions of ferrous sulphate and $KMnO_4$ for the estimation of TiO_2 and total Fe.

L. J. S.

Mason (Brian). *Minerals of the Varuträsk pegmatite. XXIII. Some iron-manganese phosphate minerals and their alteration products, with special reference to material from Varuträsk.* Geol. För. Förh. Stockholm, 1941, vol. 63, pp. 117–175, 4 figs. [No. XXII, M.A. **8**–99.]

An exhaustive survey is given of Fe–Mn phosphates occurring in (often lithium-bearing) granite-pegmatites. In addition to those from Varuträsk, Sweden [M.A. **6**–485, **8**–101], a complete list is given for other localities, including some new records. The primary minerals include the graftonite-mangualdite group, natrophilite, the triphylite-lithiophilite group, and the arrojadite-varulite group; the members of each group differing in the relative proportions of FeO and MnO. The compositions are plotted on a triangular diagram $Li_2O.2(Mn,Fe)O.P_2O_5$–$Na_2O.2(Mn,Fe)O.P_2O_5$–$3(Ca,Mn,Fe)O.P_2O_5$. The oxidation of these minerals proceeds in two stages: (1) the complete oxidation of FeO to Fe_2O_3 before any change in MnO; (2) oxidation of MnO to Mn_2O_3; this being based on the theory of oxidation-reduction potentials. Hydration produces other alteration products. Several of the names that have been applied to these secondary minerals are proved to be synonyms, with the aid of X-ray powder photographs. Chemical analyses (75) collected from the literature are tabulated and the following new formulae are suggested: varulite [M.A. **8**–101] and arrojadite, $(Na_2,Ca)O.2(Mn,Fe)O.P_2O_5$; sicklerite, $(Li,Mn'',Fe''')PO_4$; alluaudite,

$(Na,Mn''.Fe''')PO_4$; heterosite and purpurite, $(Fe''',Mn''')PO_4$. New analyses by T. Berggren: I, varulite from Varuträsk; II, Mn-sicklerite from Eräjärvi, Finland; III, Mn-sicklerite from Wodgina, Western Australia.

	P_2O_5.	Fe_2O_3.	FeO.	MnO.	Mn_2O_3.	MgO.	CaO.	Na_2O.	K_2O.	Li_2O.	Total.
I.	43·40	9·29	9·73	25·43	—	trace	2·51	8·10	trace	0·46	100·33
II.	44·45	14·58	0·00	26·14	4·89	0·59	0·84	1·17	0·13	4·89	99·76
III.	44·83	4·72	0·00	29·61	8·19	0·00	3·44	1·22	0·08	3·94	100·48

I, also H_2O+ 1·16, H_2O- 0·07, F 0·00, insol. 0·18. II, also H_2O+ 0·76, H_2O- 1·00, insol. 0·32. III, also H_2O+ 4·02, H_2O- 0·11, insol. 0·32.

L. J. S.

Quensel (Percy), with analysis by Berggren (Thelma). *Minerals of the Varuträsk pegmatite. XXIV. A new find of manganotantalite.* Geol. För. Förh. Stockholm, 1941, vol. 63, pp. 176–179.

A single, small nodule was found in a large block of spodumene with quartz. Analysis shows much lower FeO than in the small amount of material previously found [M.A. **7**–121]: Ta_2O_5 56·86, Nb_2O_5 25·68, TiO_2 0·12, SnO_2 0·19, FeO 0·20, MnO 15·95, MgO 0·31, CaO 0·00, Na_2O 0·24, K_2O trace, H_2O+ 0·17, H_2O- 0·21, total 99·93, sp. gr. 6·349.

L. J. S.

Gordon (Samuel G.). *Results of the Chilean mineralogical expedition of 1938. Part III.—Penfieldite from Sierra Gorda, Chile.* Notulae Naturae, Acad. Nat. Sci. Philadelphia, 1941, no. 69, 8 pp., 10 figs. [M.A. **8**–87.]

Small ($\frac{1}{2}$ mm.) crystals of penfieldite were found with galena and percylite in cavities in quartz veins in a small mine 10 km. from Sierra Gorda, prov. Antofagasta. Goniometric measurements gave $a : c = 1 : 0{\cdot}7848$ (*cp* 42° 11′) with 24 crystal-forms; twins on $(21\bar{3}0)$ with composition-plane (0001), and on $(41\bar{5}4)$. Penfieldite from Laurion, Greece, gave on analysis by A. Meier Pb 76·55, Cl 19·82, O (calc.) 1·47, H_2O 1·59, insol. 0·14 = 99·57, sp. gr. 6·61, giving the new formula $Pb(OH)_2.3PbCl_2$, more in line with those for laurionite $(Pb(OH)_2.PbCl_2)$ and fiedlerite $(Pb(OH)_2.2PbCl_2)$.

L. J. S.

Gordon (Samuel G.). *Results of the Chilean mineralogical expedition of 1938. Part IV.—The identity of salvadorite with kroehnkite.* Notulae Naturae, Acad. Nat. Sci. Philadelphia, 1941, no. 72, 4 pp. 4 figs.

Specimens similar to salvadorite (W. Herz, 1896) collected at the

Salvador mine, Quetena, prove to be kröhnkite with 24 crystal-forms, six of which are new, and invariably twinned on (101). Twinned crystals are also mentioned from Chuquicamata [M.A. **7**–465]. L. J. S.

Stuckey (J. L.) & Amero (J. J.). *Physical properties of massive topaz.* Journ. Amer. Ceramic Soc., 1941, vol. 24, pp. 89–92, 4 figs.

Massive topaz occurs in large quantity in a gold-quartz vein in the Brewer mine near Jefferson in Chesterfield Co., South Carolina [M.A. **7**–258]. Fluorine is expelled at 850–900° C. with destruction of the structure and decrease in the sp. gr. to 3·085: the product is mullite. Analyses of the fresh material (and after heating at 1000° C.) gave SiO_2 32·70 (32·10), Al_2O_3 57·80 (66·41), Fe_2O_3 0·75 (0·79), F 14·20 (0·80), H_2O n.d., totals 105·45 (100·10), less O for F 99·47 (99·95). Various tests were made to estimate the suitability of the material for the manufacture of electrical porcelain and sparking plugs, for which purpose it could take the place of andalusite and dumortierite. L. J. S.

Arévalo (Celso). *Estudios sobre cristales de pirita de la Sierra de Cameros y del carácter tetartoédico de éstos.* Ann. Cien. Nat. Madrid, 1940, pp. 82–95, 12 figs.

A long list of crystal-forms with high indices is given. From the irregular distribution (plotted on a stereographic projection) of (*hhk*), (*hkk*), and (*hkl*) forms it is suggested that pyrite is tetartohedral.

L. J. S.

Hall (W. Heinlen) & Hochanadel (Clarence). *Isotopic composition of cuprite oxygen.* Journ. Amer. Chem. Soc., 1940, vol. 62, pp. 3259–3260.

Water prepared from cuprite and commercial electrolytic hydrogen has a density very slightly less (5 p.p.m.) than that of water obtained from atmospheric oxygen. L. J. S.

Pamfilov (A. V.) & Ivancheva (E. G.) Памфилов (А. В.) и Иванчева (Е. Г.). О переходе структуры анатаза в структуру рутила. XVI. К химии титана. (*Sur le passage de la structure de l'anatase à la structure du rutile. XVI. Sur la chimie du titane.*) Журнал Общей Химии, Акад. Наук СССР. (Journ. Gen. Chem. Acad. Sci. USSR), 1940, vol. 10, pp. 736–744.

The inversion of anatase to rutile takes place at 800–900°, and is retarded by various impurities. L. J. S.

Frondel (Clifford). *Redefinition of tellurobismuthite and vandiestite.* Amer. Journ. Sci., 1940, vol. 238, pp. 880–888. Abstract: Amer. Min., 1939, vol. 24, no. 12, pt. 2, p. 7; 1940, vol. 25, p. 208.

Tellurobismuthite [= tellurbismuth, M.A. **8**–8, 109] Bi_2Te_3 is not to be regarded as a variety of tetradymite (Bi_2Te_2S), but as a distinct species. Material from Whitehorn, Colorado, gave a 10·51 Å., α 24° 2′ (a 4·38, c 30·6 Å.) sp. gr. 7·81, with one molecule in the rhombohedral cell. Both minerals are rhombohedral with perfect (0001) cleavage, and they show a general resemblance in their X-ray patterns. Their etch reactions and those of grünlingite and joseite are compared. [M.A. **6**–38; **7**–231, 386.] Vandiestite [Min. Mag. **13**–378] from Colorado is a mixture of tellurobismuthite and hessite (Ag_2Te). Analysis by F. A. Gonyer of material containing 7·9 % of hessite gave Bi 48·96, Pb 0·67, Ag 5·08, Te 45·48 = 100·19. L. J. S.

Palache (Charles) & Gonyer (F. A.). *Microlite and stibiotantalite from Topsham, Maine.* Amer. Min., 1940, vol 25, pp. 411–417, 2 figs.

Large green octahedra of microlite, previously described as gahnite, associated with albite in topaz-pegmatite, sp. gr. 6·41, n 2·023, unit-cell edge 10·39 Å., yield Ta_2O_5 74·27, Nb_2O_5 3·56, WO_3 0·17, SnO_2 1·61, CaO 15·03, MgO 0·07, UO_3 0·77, Yt_2O_3 0·35, Ce_2O_3 0·26, Na_2O 3·37, K_2O 0·41, H_2O 0·27, total 100·14. Brown octahedra of microlite, sp. gr. 6·36, are also found with columbite intergrown with platy albite. Small crystals of stibiotantalite, sp. gr. 6·57, with forms m (110), w (111), and the perfect cleavage b (010), are referred to a new setting $a : b : c$ = 0·4169 : 1 : 0·4696, and the space-group is now given as $C_{2v}^6 = Pcn$. F. A. B.

Pabst (A.). *Cryptocrystalline pyrite from Alpine County, California.* Amer. Min., 1940, vol. 25, pp. 425–431, 4 figs.

Tertiary volcanics carry a horizontal sheet of opalized tuff 100 feet thick containing, at the Leviathan sulphur mine, about 35 % sulphur. Some of the tuff has been replaced by black or grey cryptocrystalline iron sulphide now shown by X-ray photographs and chemical analyses to be pyrite. The nature of the material originally described as melnikovite is still uncertain, but no one has yet proved that solid FeS_2 occurs in a non-crystalline state. F. A. B.

Ayres (V. L.). *Mineral notes from the Michigan iron country.* Amer. Min., 1940, vol. 25, pp. 432–434.

Chestnut-brown stilpnomelane from Crystal Falls, α 1·634, β and γ 1·730, 2V 0°, gives SiO_2 42·42, Al_2O_3 6·71, Fe_2O_3 33·24, FeO 0·85,MnO 2·27, MgO 5·20, H_2O+ 8·33, H_2O- 1·45, total 100·47, but no potash. Other minerals reported for the first time from this locality are halloysite, nontronite, and phosphorochalcite. F. A. B.

Pough (Frederick H.). *Willemite morphology and paragenesis at Balmat, New York.* Amer. Min., 1940, vol. 25, pp. 488–496, 5 figs.

Two types of non-fluorescent willemite crystals in compact chlorite with ilvaite, galena, haematite, and garnet are described from the St. Joseph Lead Company mine, Balmat, St. Lawrence County [M.A. **6**–368]. One type, 1 mm. thick and 2–2½ mm. in diameter, shows $e(10\bar{1}2)$, $a(11\bar{2}0)$, and $c(0001)$ small [Dana's letters]. Druses in the chlorite are lined with the second type of willemite crystals, which are smaller and have complex tetartohedral forms and striated (0001). New forms observed are $(8.5.\bar{1}\bar{3}.0)$, $(52\bar{7}0)$, and $(41\bar{5}0)$. F. A. B.

Palache (Charles). *Cuprobismutite—a mixture.* Amer. Min., 1940, vol. 25, pp. 611–613, 2 figs.

The original specimen analysed by Hillebrand (1884) and named cuprobismutite by Dana (1892) proves on re-examination to be a mixture of emplectite and bismuthinite. The former shows the forms $k(011)$, $s(051)$, $h(201)$, $u(111)$, $y(221)$, and $p(131)$ (Dauber's setting, 1854), and bismuthinite $q(130)$, $o(120)$, $m(110)$, $n(210)$, $N(021)$, $Z(301)$, $S(111)$, $\alpha(221)$, $w(121)$, and $\sigma(211)$ (Groth's setting 1880). F. A. B.

Fleischer (Michael) & Ksanda (C. J.). *Dehydration of pollucite.* Amer. Min., 1940, vol. 25, pp. 666–672, 1 fig.

Dehydration curves of pollucite from Hebron, Maine, and Elba up to 800° C. do not agree with Strunz's for material from Elba [M.A. **6**–412]. The refractive indices of the two samples fell from 1·523 to 1·513 and from 1·520 to 1·506 respectively and the unit-cell dimensions 13·696±0·005 Å. are not changed by dehydration. Partial rehydration only takes place at 500° C. in a steel bomb at high pressures, 300–400 atm. The differences in behaviour between pollucite and analcime are probably due to the larger caesium ion occupying more of the 'free' space in the crystal-structure, accounting for the low water-content and difficulty of dehydration. F. A. B.